REMARKS/ARGUMENTS

Claims 1 to 23 are currently pending in this application. Claim 1 has been amended with this response, no new matter has been added with this response.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected all of the pending claims as unpatentable under 35 U.S.C. §103(a) over Odagawa et al. (USPN 5,647,921) in view of either Libermann (USPN 4,791,979) or Pryor et al. (USPN 4,648,437) in further view of the teachings of Apfel (USPN 5,384,203). Applicants respectfully traverse this rejection.

The current invention is directed to an improved process for producing thick continuous sheet sections of amorphous metal foams. To accomplish this Applicants have modified conventional continuous sheet casting processes to include a stabilization step that carefully controls the temperature of the molten alloy between the melting temperature (T_m) and the crystallization cooling curve nose temperature (T_{NOSE}) so that the exact viscosity of the liquid alloy can be controlled prior to introduction of the alloy onto the sheet casting roller.

In contrast, the Odagawa et al. and Arakawa et al. references are directed to conventional methods of forming smooth sheets of amorphous materials, and the Apfel reference is directed to the formation of foam materials in a non-continuous batch process. In short, the combined references simply do not teach the method of the instant invention. Specifically, the instant invention teaches that to form continuous sheets of foam amorphous materials it is necessary to control the viscosity of the amorphous feedstock. However, the Examiner dismisses Applicants' previous arguments by stating the critical step of "stabilizing" in Applicants' claims contains no information concerning the "casting temperature" used and so being a "relative" term may cover the processes set forth in the prior art. (Office action, page 2.)

To address this short-coming, Applicants have amended the pending claims to specify that the bulk metallic glass material must be "stabilized" within a temperature range defined by the "melting" and "nose" temperatures of the bulk metallic glass. The specification makes clear that it is in this tight "window" of temperatures that the materials will have the requisite viscosity properties. (See, Specification, page 8, line 30 to page 9, line 10.)

The Examiner has acknowledged that nowhere, do any of the prior art patents ever discuss a stabilization step. Now that stabilization step, as set forth in the claims, provides specific and objective criteria that must be met to practice the method of the current invention, Applicants submit that the term "stabilization" can no longer be considered "relative". Moreover, the claims of the current invention further require that only such "stabilized" amorphous material be "introduced" into the casting apparatus. As such, it is not true that merely introducing molten foamed amorphous material to a moving casting roller, as described by all of the prior art references, can be seen as equivalent to the process described by the instant invention, as it is nowhere suggested that the temperature of that material should be manipulated at all, much less that it should be "stabilized" within a specific temperature window as set forth by the current invention.

In conclusion, all of the prior art patents cited by the Examiner are focused on either conventional methods of forming thin continuous foamed sheets of amorphous materials by adjusting the roller speed and nozzle alignment/design, or are directed to conventional methods of "batch" forming amorphous foams. These are precisely the type of conventional techniques that the current invention was designed to modify to allow for the continuous casting of thicker amorphous foam sheets. Accordingly, Applicants submit that one of skill in the art, having read the combined disclosures of the Odagawa et al., Pryor et al., Liebermann and Apfel et al. references, would not have

had any direction as to how to include a viscosity stabilization step in their foam casting process, as required by the claims of the current application, much less direction as to stabilizing the foamed material within a temperature window defined by the melting temperature and "nose" temperature of the alloy, as required by the claims of the current application, but rather would have been reassured that conventional techniques that alter the roller speed, nozzle width, nozzle gap, etc. of a continuous casting apparatus would have been sufficient to form thick sheets of amorphous foams. As such, Applicants believe the combination of the cited references would have reinforced the need to resort to such "mechanistic" manipulations, leading one of ordinary skill further away from Applicants own casting technique.

In summary, given the process parameters repeatedly taught by the cited prior art, one of skill in the art would have had no motivation to modify those same references to produce the method claimed in the current application. Accordingly, Applicants submit that the claimed invention cannot be said to be obvious in light of the cited combination of references.

Examiner's Comments

The Examiner again noted that this application and U.S. Patent Application No. 10/552,667 have similar subject matter and identical priority date, but different inventorship. Applicants submit that they have reviewed the facts surrounding the filing of both of the applications and confirm that the inventorship is correct as the inventor of the instant application and the inventor named in Application No. 10/552,667 operated independently in developing the cited inventions.

Conclusion

In view of the foregoing amendment and response, it is believed that the application is in condition for further examination. If any questions remain regarding the allowability of the application, Applicant would appreciate if the Examiner would advise the undersigned by telephone.

Respectfully submitted,

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